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NEW FOSSIL MAMMALS FROM THE SNAKE CREEK QUARRIES¹

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The collection made by Albert Thomson for the Museum in 1923 in Sioux County, Nebraska, includes considerable additions to the material from the Upper Snake Creek and Lower Sheep Creek beds (*Hipparrison affine* zone, *Merychippus primus* zone). Some references to certain specimens were made in my last contribution to this fauna. A number of new or little known genera and species are described in the following pages.

Sthenictis bellus, new species

TYPE.—No. 20501, a right ramus of the lower jaw, with p_2-m_1 preserved.

HORIZON AND LOCALITY.—Sheep Creek beds, Horizon A, Stonehouse draw quarry.

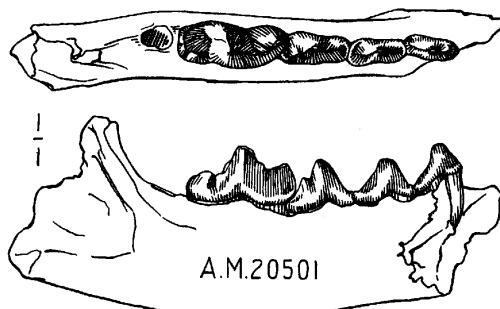


Fig. 1. *Sthenictis bellus*, sp. nov. Type, No. 20501. Lower jaws—outer and crown views, natural size.

CHARACTERS.—Size much less than *S. dolichops*, about equal to *Mionictis incerta* or *Brachypsalis matutinus*, but agrees with *Sthenictis* and differs from the other two in the construction and proportions of the carnassial and premolars. The second, third and fourth premolars are two-rooted, compressed, not crowded, p_4 with well developed posterior accessory cusp. The shear of the carnassial is nearly antero-posterior, the metaconid well developed but not nearly as high as in *Mionictis* or

¹Snake Creek Contribution No. 4.

²The manuscript of this paper is one of several left at the American Museum by Dr. Matthew at the time of his death in September, 1930. It was apparently written about 1924, a year after the material was collected, and had been held awaiting illustrations. The section on *Archaeohippus* was added subsequent to 1925. The paper is printed without additions or alteration.—Walter Granger.

Brachypsalis. The last molar has a single alveolus, which apparently contained a large anterior and smaller posterior root, closely connate. In *S. dolichops* the alveolus is round-oval apparently for a single root.

So far as the characters of the type jaw permit one to judge, this species is the ancestor in the *M. primus* zone of *S. dolichops* of the *M. paniensis* zone.

***Cynarctus mustelinus*, new species**

TYPE.—No. 20502, lower jaw fragment with m_{1-2} . Paratype, No. 20503, lower jaw with p_{3-4} and m_{2-3} . Both from the Sheep Creek beds, *M. primus* zone, at Stonehouse draw quarry.

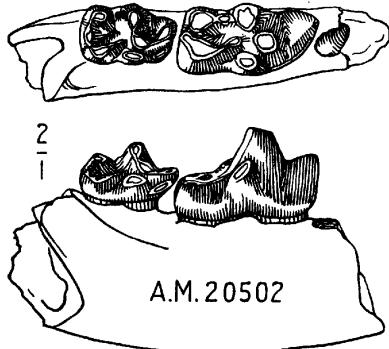


Fig. 2

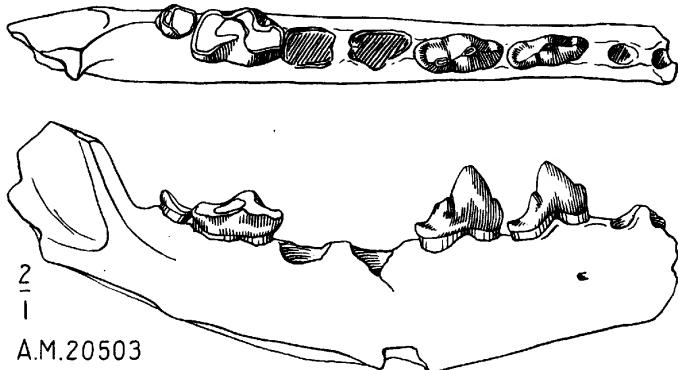


Fig. 3

Fig. 2. *Cynarctus mustelinus*, sp. nov. Type, No. 20502. Lower jaw—outer and crown views, twice natural size.

Fig. 3. *Cynarctus mustelinus*. Paratype, No. 20503. Lower jaw—outer and crown views, twice natural size.

Size much less than either *C. saxatilis* Matthew or *C. crucidens* Cook and more primitive than either species; the second molar two-thirds the length of m_1 ; in *C.*

saxatilis of the *M. paniensis* zone it is nearly three-fourths and in *C. crucidens* of the *Hipparrison* zone it is approximately seven-eighths as long, the breadth increasing in about the same proportion. The last molar in *C. mustelinus* is very small, only a third the length of m_2 ; in *C. saxatilis* it is three-fifths as long, in *C. crucidens*, over two-thirds.

MEASUREMENTS IN MILLIMETERS

	<i>C. mustelinus</i>	<i>C. saxatilis</i>	<i>C. crucidens</i>
Length of m_1	8.5	16.1	10.5
" " m_2	5.7	11.6	9.2
" " m_3	2.0	7.0	6.3
Width of trigonid of m_1	3.7	6.7	4.5
" " heel of m_1	3.7	7.2	5.3

It will also be observed that the width of the carnassial talonid increases progressively, relative to the width of trigonid.

This species serves to indicate a probable derivation of *Cynarctus* from the *Nothocyon* group of the John Day and Lower Miocene formations, more particularly from *N. lemur* and *N. latidens*, rather than from the type species of *Nothocyon*, *N. geismarianus*. '*Cynarctus*' *acridens* Cook of the Upper Harrison beds, Lower Miocene, of Nebraska is intermediate in age and apparently in character, but so far as one can judge from the inadequate type, a jaw fragment with m_1 , it is nearer to *Nothocyon* of the Lower Miocene than to *Cynarctus* of the Middle and Upper Miocene, and should be referred to the former genus, already known from skulls and parts of skeletons from the Lower Miocene of South Dakota as well as from the typical John Day skulls and skeletons. The adaptation and skull and skeletal characters of *Cynarctus* remain obscure; it parallels *Arctonyx* but can hardly be related.

Desmathyus validus, new species

TYPE.—No. 20506, upper jaw, young, with dp^3-m^1 and p^3-4 preformed. Stonehouse draw quarry, *Merychippus primus* zone.

CHARACTERS.—Slightly larger than *D. pinensis*; p^3 sub-oval in form, nearly as large as p^4 and similar in cusp construction. In *D. pinensis* the inner crescent of p^3 is smaller and imperfect, giving the tooth a sub-trigonal outline.

This species is clearly a stage further advanced than its Lower Miocene predecessor *D. pinensis* of the Upper Rosebud, which in turn is a little more advanced than *D. siouxsensis* of the Harrison. The third molar has completed its inner crescent and become entirely like the fourth. Like *Platygonus* and unlike the *Prosthennops-Dicotyles-Mylohyus* group, the premolars remain bicuspid and do not become progressively molariform. Possibly *D. validus* is an ancestral type for *Platygonus*, but the intermediate stages are unknown.

It may be observed in this connection that *Prosthennops* and *Mylohyus* are not ancestral to *Dicotyles*, and the very common assumption that the "peccaries" of the American Pleistocene indicate a warmer climate is based on the mistaken notion that they are extinct species of the existing tropical genus. This is true as to the tapirs but not as to the peccaries. Whether the climatic inference is warranted even with the tapirs may be open to question; the relationship is no closer in that case than between the tropical *Elephas indicus* and the arctic *E. primigenius*. But the Pleistocene peccaries, both *Platygonus* and *Mylohyus*,

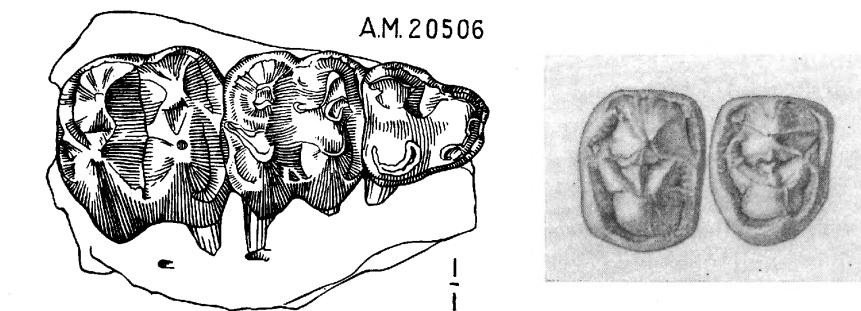


Fig. 4

Fig. 4. Desmathyus validus, sp. nov. Type, No. 20506. Left, crown view of dp^3-4 and m^1 . Right, crown view of unerupted p^3-4 . Both natural size.



A.M. 20489.

Castor sp.

Fig. 5.
Castor sp.
No. 20489.
Lower pre-molar-outer
and crown
views,
natural size.

are extinct genera decidedly more specialized in skull, teeth and feet than the modern peccaries, as well as larger in size. The relationship of *Mylohyus* to *Tagassu* is perhaps comparable to that between the woolly rhinoceros (*Coelodonta antiquitatis*) and the modern white rhinoceros (*Ceratotherium simum*), while *Platygonus* is about as distant from the modern peccaries as *Elasmotherium* from the modern rhinoceroses.

A single lower tooth, p_4 , A.M. 20489, from the Upper Snake Creek beds, agrees so nearly with the existing *Castor* that I am obliged to refer it to that genus. It is about the maximum of size for existing species and comes within the variation limits of dental structure, generic and individual, that I find in comparing with a series of modern jaws.

This is the first Tertiary record of true *Castor* in America, the Tertiary species formerly referred to it having been removed to other genera. It occurs in the Pliocene of Europe; according to Depéret, it first appears in the Pontian zone.

Gaillardia¹ thomsoni, new genus and species

TYPE.—No. 20508, a lower jaw, left ramus complete, with p_3 - 4 , m_3 and alveoli of remaining teeth, from the Upper Snake Creek beds.

DIAGNOSIS.—Dentition probably $\overline{1.1.4.3}$. Jaw long, slender, proportioned as in *Talpa*, condyle knot-like, not transversely expanded, angular process a short flat transverse plate set at right angles to the plane of the jaw, coronoid process long,

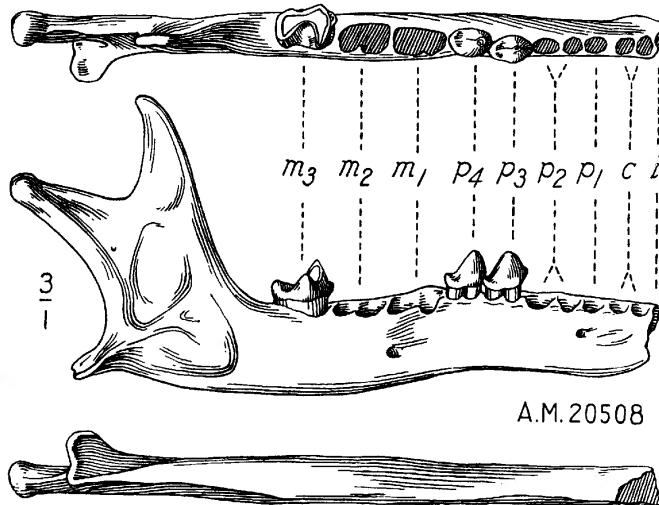


Fig. 6. *Gaillardia thomsoni*, gen. et sp. nov. Type, No. 20508. Lower jaw—outer, crown and under views, twice natural size.

projecting backward at 45° to line of teeth and but little recurved at tip, dentary portion of jaw long and slender, shallowed under premolars as in *Talpa*, posterior mental foramen under m_1 . Tooth row continuous without diastemata, teeth neither spaced nor crowded. Last molar brachydont, tritubercular, the trigonid shorter and wider than in *Talpa* or *Condylura*, the heel lower than trigonid and of about the same width. Third and fourth premolars of equal size, two-rooted, simple, robust, resembling those of *Myogale*; in front of these are two alveoli, probably for a p_2 longer than p_3 or p_4 , then a single socket of sub-ovate outline, probably for p_1 ; in front of that is a double socket for a two-rooted canine; each of the two alveoli

¹In honor of Claude Gaillard, distinguished palaeontologist, who has contributed largely to our knowledge of Tertiary Insectivora. The species name is in honor of the discoverer, Albert Thomson of the Museum staff.

slightly larger than that of p_1 ; and at the anterior end, a single enlarged socket for a partly procumbent tooth.

I cannot place this jaw in any of the described genera of Talpidæ. It is distinguished from most of them by the reduction of the incisors to a single enlarged tooth; this also separates it from *Myogale* and *Galemys*, to which the premolars suggest relationship. The twinned alveoli behind this enlarged root cannot well be anything but a double-rooted canine. Were they for two incisors, the alveoli would be more separate at the alveolar border, for the dentition is evidently not crowded. They are also too closely connate to interpret the posterior one as the anterior root of a two-rooted first premolar (an improbable feature at best in this group). No other alternate can be suggested. From *Amphidotozotherium* it is separated by the simple non-molariform p_4 . It resembles *Condylura* in its slender proportions, more elongate than in *Talpa*, but the premolars are of different type, with robust and simple crowns, while *Condylura* has slender, sharp-pointed premolars with well developed heels and accessory cusps. *Scalops* and *Scapanus* have much shorter jaws with higher crowned molars. None of the Talpidæ have the peculiar construction of angle and coronoid seen in *Gaillardia*; *Condylura* perhaps comes nearest, but the angle in that genus is a long slender spine, extending backward and curving upward. No other Insectivora, Chiroptera or Menotyphla present these peculiar characters, so far as I have been able to make comparisons.

Procamelus near robustus Leidy

No. 20478, a lower jaw with part of skeleton associated, is from a pocket of somewhat uncertain horizon. It lay directly on top of the eroded surface of the Sheep Creek, at a level a little below the top of that formation, and lower than some other marginal specimens which certainly belong in the *paniensis* phase. It may, nevertheless, be a pocket of later age, let down to the lower level; as no other specimens were found with it, this cannot be verified. The species does not agree closely with any of the known Camelidæ, but is nearest to *P. robustus*, as represented by Leidy's type and various jaws in our collection, some of which are topotypes. It is a little smaller than *robustus*; the premolars are slightly less reduced. As compared with *Alticamelus leptocolon*, the teeth are of about the same size, but premolars 2 and 3 more reduced, m_3 more narrow and hypsodont. It differs from *Protolabis angustidens* in the larger relative size of the anterior molar and the premolars; from *P. heterodontus* also in the equal spacing of p_1 between c and p_2 . These

are the nearest among the described species. *Protolabis* is separated, moreover, by the entirely different proportions of limbs and feet. *Alticamelus* is similarly separated, though by no means so clearly, by a disproportion in limbs and feet, in the opposite sense.

While the horizon of this specimen is uncertain, it is probably nearer to Lower than to Upper Snake Creek. It suggests that *Procamelus* is a derivative of *Alticamelus*, but that *Protolabis* is a distinct phylum.

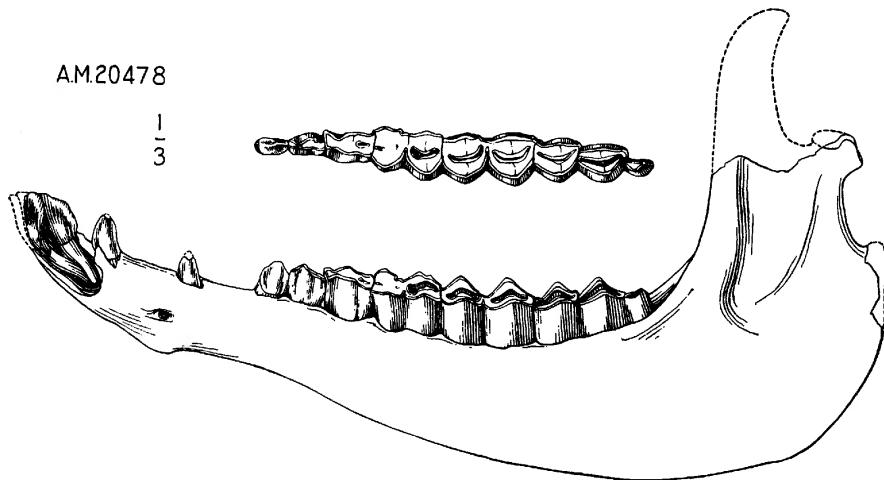


Fig. 7. *Procamelus* near *robustus*. No. 20478. Outer view of lower jaw and crown view of cheek teeth, one-third natural size.

Archæohippus penultimus

A number of immature palates and jaws, with some foot bones associated, Nos. 21532-35, were found together by Mr. Paul C. Miller in 1925, along with jaws of *Blastomeryx* and *Dyseomeryx*. The horizon is the Lower Sheep Creek beds in *Aphelops* draw, Snake Creek Quarries, Sioux County, Nebraska. No other Equidæ remains were present.

The milk teeth and the unworn permanent molars are preserved, and the characteristic deep restricted preorbital fossa very well shown. The foot bones are metatarsals II, III, IV, three phalanges of digit III, calcaneum, part of navicular, magnum, unciform, etc.; there are also most of the ulno-radius, tibia, three cervical vertebræ and many fragments.

Archæohippus was regarded by Gidley as intermediate between *Hypohippus* and *Parahippus*. The evidence of these specimens indicates that it is much closer to *Parahippus* than to the anchitheriine genera.

The teeth agree except for the lack of any trace of crochet. They share the rugose enamel, the broken protoloph, with protocone half separate, the rounded and well separated metaconid and metastylid, the unreduced $M\ddot{s}$. The peculiar type of preorbital fossa, shown clearly in our specimens, as also in the type of *A. ultimus*, is unlike any of the Miocene equines excepting *Parahippus pristinus* of the Lower Rosebud. The ulnar shaft is much reduced but completely separate from the radius as in *Parahippus*. This, however, has no great significance as the animal was immature. The metatarsal is like those of small *Parahippi* and of *Merychippus primus* in that the inner cuneiform has no footing on its head. In *Anchitherium*, *Kalobatippus* and *Hypohippus* the metatarsal has a well developed proximal facet for the inner cuneiform, as also in *Equus*, *Pliohippus*, the European hipparions and the later American species. The shafts of the lateral metatarsals are reduced about as in *Parahippus pristinus*, rather less than *Merychippus primus*, and the cross section of the shaft is round oval as in the protohippine horses generally (including *Parahippus*) in contradistinction to the anchitheriine horses in which it retains the flat form of *Mesohippus*. The phalanges are moderately elongated as in *Parahippus* and the protohippine horses, in contrast to the very short, wide and flattened phalanges of the anchitheriine horses (including *Mesohippus*).

The above data show that *Archæohippus* is very closely related to *Parahippus*, and belongs without question in the protohippine group, not in the anchitheriine group. Whether it is deserving of generic separation is very doubtful; it certainly does not represent, as Gidley at first considered, a third phylum of Miocene brachydont horses as different from *Hypohippus* and *Parahippus* as these are from each other. *Parahippus* includes, indeed, a wide variety of species and should probably be split up into a number of subgenera. Of these, *Archæohippus* might be one, and should probably include *P. pristinus* as well as *A. ultimus*, *penultimus* and *mourningi*.